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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/536,774

05/26/2005

Tatsuru Shirafuji

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EXAMINER

MUSTAPHA, ABDULFATTAH B

ART UNIT

PAPER NUMBER

2812

MAIL DATE

DELIVERY MODE

04/09/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/536,774	<b>Applicant(s)</b> SHIRAFUJI ET AL.	
	<b>Examiner</b> ABDULFATTAH MUSTAPHA	<b>Art Unit</b> 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-12 is/are allowed.
- 6) ☒ Claim(s) 1-8 and 13-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments, see Applicant Arguments/ Remarks, filed 03/09/2009, with respect to the rejection(s) of claim(s) 1 – 8 and 13 – 20 under Non-Final Rejection have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Yang et al., Ishizuka et al., and Iwabuchi et al..

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 7, 8, 13, 14, 19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Yang et al. [US 6,440,878].

Yang et al. disclose introducing a mixed gas comprising a first carbon fluoride gas and a second carbon fluoride gas (76, 102) [Figures 1 and 2] on a substrate 164, 150 placed inside a chamber, and depositing a fluorocarbon film on said substrate [Col.

Art Unit: 2812

5; Line 33 – 60, Figure 12 and 13]; forming voids in said fluorocarbon film by selectively removing volatile components contained in said fluorocarbon film [Col. 6; Line 24 – 43] (Claims 1 and 13). Yang et al. disclose introducing a mixed gas comprising a first carbon fluoride gas and a second carbon fluoride gas (76, 102) [Figures 1 and 2] on a substrate 164, 150 placed inside a chamber, depositing a fluorocarbon film on said substrate [Col. 5; Line 33 – 60, Figure 12 and 13]; forming voids in said fluorocarbon film by selectively removing volatile components contained in said fluorocarbon film; wherein said first carbon fluoride-containing compound having 4 to 5 carbon atoms; and said second carbon fluoride gas is a fluorine-containing compound having 6 to 12 carbon atoms {Col. 6; Line 24 – 43} (Claims 2 and 14). Yang et al. disclose for forming voids includes a step for heating said fluorocarbon film {Col. 3; Line 1 – 23} (Claims 6 and 18). Yang et al. disclose chamber is a plasma exciting chamber that can internally generate plasma {Col. 2; Line 4 – 23} (Claim 7 and 19). Yang et al. disclose first carbon fluoride gas has relatively high volatility and said second carbon fluoride gas has relatively low volatility {Col. 2; Line 24 – 43; Col. 6; Line 24 – 43} (Claims 8 and 20).

Claims 1, 2, 13 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Akahori et al. [US 6,215,087].

Akahori et al. disclose introducing a mixed gas comprising a first carbon fluoride gas and a second carbon fluoride gas on a substrate 10 placed inside a chamber, and depositing a fluorocarbon film on said substrate [Figures 1 and 14]; forming voids in said

Art Unit: 2812

fluorocarbon film [Col. 13; Line 1 – 8, Figure 19] by selectively removing volatile components contained in said fluorocarbon film [Col. 13; Line 20 – 26] {Col. 5; Line 3 – 40, Figures 1, 14, 19 and 20} (Claims 1 and 13). Akahori et al. disclose introducing a mixed gas comprising a first carbon fluoride gas and a second carbon fluoride gas on a substrate placed inside a chamber, depositing a fluorocarbon film on said substrate; forming voids in said fluorocarbon film by selectively removing volatile components contained in said fluorocarbon film [Col. 13; Line 20 – 26] {Col. 5; Line 3 – 40, Figures 1, 14, 19 and 20}; wherein said first carbon fluoride-containing compound having 4 to 5 carbon atoms; and said second carbon fluoride gas is a fluorine-containing compound having 6 to 12 carbon atoms {Col. 6; Line 1 – 24} (Claims 2 and 14).

Claims 1, 2, 13 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Eida et al. [US 2002/0122096].

Eida et al. disclose introducing a mixed gas comprising a first carbon fluoride gas and a second carbon fluoride gas on a substrate 7 placed inside a chamber, and depositing a fluorocarbon film 2 on said substrate [0093, figure 2 1 and 6]; forming voids 4, 120 in said fluorocarbon film [Figure 22] by selectively removing volatile components contained in said fluorocarbon film {0086 – 0093, Figures 1, 6, 8 and 9} (Claims 1 and 13). Eida et al. disclose introducing a mixed gas comprising a first carbon fluoride gas and a second carbon fluoride gas on a substrate placed inside a chamber, depositing a fluorocarbon film on said substrate; forming voids in said fluorocarbon film by selectively

Art Unit: 2812

removing volatile components contained in said fluorocarbon film {0086 – 0093, Figures 1 and 6}; wherein said first carbon fluoride-containing compound having 4 to 5 carbon atoms; and said second carbon fluoride gas is a fluorine-containing compound having 6 to 12 carbon atoms {0153 – 0161, Figures 1, 6, 8 and 9} (Claims 2 and 14).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 4, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. [US 6,440,878] as applied to claims 2 and 14 above respectively, and further in view of Iwabuchi et al. [US 6,531,409].

Iwabuchi et al. first carbon fluoride gas is octafluorocyclopentene ( $C_5F_8$ ) {Col. 5; Line 43 – 45} (Claims 3 and 15). Iwabuchi et al. disclose second carbon fluoride gas is hexafluorobenzene ( $C_6F_6$ ) {Col. 5; Line 43 – 45} (Claims 4 and 16).

Yang et al. fail to disclose first carbon fluoride gas is octafluorocyclopentene ( $C_5F_8$ ); and second carbon fluoride gas is hexafluorobenzene ( $C_6F_6$ ).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the invention of Yang et al. by adding first carbon fluoride gas is octafluorocyclopentene ( $C_5F_8$ ) and second carbon fluoride gas is hexafluorobenzene ( $C_6F_6$ ) as taught by Iwabuchi et al. in order to enhance thermal stability of the film.

Claims 5 and 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. [US 6,440,878] as applied to claims 1 and 13 above respectively, and further in view of Tsai et al. [US 2004/0161946].

Yang et al. fail to disclose step for cleaning said fluorocarbon film with a supercritical fluid.

Tsai et al. disclose for forming voids includes a step for cleaning said fluorocarbon film with a supercritical fluid {0033} (Claims 5 and 17).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the invention of Yang et al. by adding for forming voids includes a step for cleaning said fluorocarbon film with a supercritical fluid as taught by Tsai et al. in order to control the temperature of the substrate.

***Allowable Subject Matter***

Claims 9 – 12 are allowed.

The following is an examiner's statement of reasons for allowance:

None of the prior arts disclose "specific inductive capacity is within a range of 2 or less" as recited in independent claim 9.

Since the references either singly or in combination do not show all elements of the claims, the subject matter of the claims is properly allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABDULFATTAH MUSTAPHA whose telephone number is (571)272-9736. The examiner can normally be reached on Mon-Thus. (10:00am - 8:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber can be reached on 571-272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 2812

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Abdulfattah Mustapha

/Charles D. Garber/  
Supervisory Patent Examiner, Art Unit 2812